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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,312	06/05/2001	Masumi Oshima	1975.1038	5718

21171 7590 03/16/2007
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EXAMINER

AWAI, ALEXANDRA F

ART UNIT	PAPER NUMBER
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3663

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 09/873,312	Applicant(s) OSHIMA ET AL.	
	Examiner Alexandra Awai	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/22/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/22/2006 have been fully considered but they are not in every respect persuasive. Those objections and rejections that have been overcome are omitted from the present Office Action and are considered withdrawn. Claims 4 and 5 have been amended.

With regard to the first issue (regarding page 2, lines 1-10) Applicant has mischaracterized the state of the prior art, especially as it is addressed in the disclosure. That is, the conventional neutron analysis addressed as prior art in the instant specification involves only *single detector units*. Consider the following excerpts:

"In the conventional analysis of radioactivity, gamma-rays emitted from radionuclides are measured with a single unit of germanium semiconductor detector" (p. 2, lines 6-8),

"In this neutron radioactivation analysis method, the sample of interest is radioactivated by neutrons from a reactor and the gamma-rays emitted from the sample are measured with a single unit of high-resolution germanium detector" (p. 2, lines 24-8),

"Fig. 1 shows a conventional method of gamma-ray measurement by radioactivation. A sample 1 radioactivated by thermal neutrons from a reactor emits gamma-rays which are measured with a single unit of germanium detector 2" (p. 3, lines 12-15), and

"In the conventional method of radioactivation analysis, a sample radioactivated by neutrons from a reactor is measured with a single unit of germanium detector" (p. 4, lines 22-25).

However, the conventional method discussed in the specification as shown above is not the most advanced conventional method known to skilled artisans. The feature that allows a plurality of gamma-rays emitted concurrently to be identified at the same time *is* the fact that there are a

Art Unit: 3663

plurality of gamma-ray detectors. Where multiple detectors are used, resolution may be improved, especially where accompanied by advanced computer analysis.

With regard to the second issue (page 2, lines 10-14), Applicant's discussion of one, non-limiting way of making a three dimensional plot does not change the fact that the references need not disclose a two-dimensional matrix, *per se*, as stated in the previous Office Action.

With regard to the third and fourth issues (page 2 to page 4), Examiner regrets misinterpreting the figures and concedes that the 10 peaks shown in Fig. 2 are "a superposition" of 20 measured gamma-ray energies peaks representing only 5 different types of emission events, each characterized by two coincident emissions. However, the fact that certain coincident gamma-rays indicates certain nuclides is not Applicant's own discovery, and Applicant is not the first to use coincidence data in order to improve resolution. In the case of Cole et al., the samples (spectra shown in 4A and 4B) do not comprise only Mo isotopes, which nevertheless qualifies as a number of radionuclides. The gamma neutron assay method of Cole et al. is practiced using samples including materials such as nuclear waste, with 4A identifying the presence of fissioning californium and 4B identifying the presence of fissioning plutonium.

With regard to the rejection under 35 U.S.C. § 103, Examiner does not consider any one of the parameters represented on the three-dimensional plot to be insignificant. However, simultaneous analysis of coincident gamma-rays from multiple radionuclides does not require the exclusive application of the two-dimensional matrix of the present invention. In fact, Applicant admits that any suitable equivalent of the two-dimensional matrix may be used. Given the known technique of discriminating based on coincidence data to improve resolution and the known strategy of displaying three variables on a three dimensional plot, the skilled artisan does

Art Unit: 3663

not require guidance from Applicant to produce the claimed invention, which is motivated by the prior art advantage of facilitating data analysis. This position is set forth in greater detail in the clarified rejection of the newly amended claims. Moreover, it is entirely possible to determine the multiple radionuclides present in a sample even by using only a single, gamma-ray detector, for example. The alleged contribution over the prior art is apparently a discrimination analysis wherein only simultaneous counting events are graphically quantified, not the ability to detect multiple radionuclides in the first place.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is insufficient antecedent basis for "the peak" (claim 4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

Art Unit: 3663

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 4 and 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Cole et al. (5,378,895), and further in view of Shao et al. (5,999,588) and admissions by Applicant.

Cole et al. disclose a gamma neutron assay technique (GNAT) that is capable of determining isotopic ratios of fissionable material (special nuclear materials, as discussed in the Background section) based upon the prompt coincidence relationships that occur in the fission process and the proton conservation and quasi-conservation of nuclear mass that exists between the two fission fragments. It is used both with and without an external neutron source for inducing nuclear reactions and requires an array of two or more gamma-ray detectors (Abstract).

The method of using the GNAT comprises, among others, the following steps (see col. 5):

- Exposing an array of detectors to radiation from special nuclear material;
- Monitoring the radiation emitted from the material to determine if two or more gamma-ray pulses occur in close time proximity;
- Amplifying and digitizing any gamma-ray pulses that occur;
- Expanding and inputting any gamma-ray pulses that occur, to a coincidence and master gate unit, to an analog digital converter and to a timing and digital converter;
- Monitoring for a specific time overlap of expanded gamma-ray pulses in the coincidence and master gate unit;
- Outputting a master gate signal to the analog digital converter, the timing digital converters, the coulomb digital converters and a majority and logic unit, when the specific time overlap equals or exceeds a predetermined value, thereby inputting a multiplicity of digital signals to a computer for analysis and data recording; and then
- Processing the data recording to determine the type of fissionable nuclear materials and a ratio of their masses.

Art Unit: 3663

The basis for this method is that the use of multiple coincidence relations causes the relative background to signal coupling ratios to be reduced to the point that weak signals from elements of interest can be observed and used as signatures. Cole et al. teach that, “The problems of weak- or low-energy gamma-rays in a high background field are not a problem with GNAT as we are looking at high-energy gamma rays and the coincidence requirement reduces the background” (col. 4, lines 20-24).

As evidenced by the foregoing discussion, Cole et al. specifically discloses “providing”, “detecting”, “specifying” and “comparing” comparing steps that correspond to those claimed (also see Table 1), and additionally teaches that the interrogated material may be nuclear waste, which is a sample produced by induced nuclear reactions. More importantly, the means of improving resolution by discriminating based on coincidence data taught by Cole et al. is the same as that which defines an aspect of the instant invention as described in the disclosure:

“The multiple gamma-ray detector assembly to be used in the invention consists of at least two gamma-ray detectors. Signals from the two detectors are fed to a fast simultaneous counter which chooses only simultaneous counting events. At the same time, the energy information from the two detectors is taken into the computer. On the basis of this information, the correlation between two gamma-rays is represented on a two-dimensional matrix by means of a frequency distribution of events. The two dimensional matrix may be replaced by any suitable equivalents” (specification, p. 11, lines 18-28).

The “constructing” step of claim 4 is therefore one, technically non-limiting way of expressing coincidence data that is within the purview of the skilled artisan.

Shao et al. demonstrate the notoriously well-known fact that skilled artisans commonly utilize three-dimensional plots (col. 12, lines 54-58). Shao et al. is related to the present application by both field of endeavor (detector systems) and problem solving area (improving analysis of data derived from gamma detectors). While Shao et al. does not provide specific

Art Unit: 3663

teachings regarding the particular variables and particular configuration of the claimed invention, it is not referenced for such teachings, and therefore is not required to provide such teachings. As the instant invention has to do with the problem solving area of improving resolution, it is an incontrovertible fact that Shao et al. has *some* relationship with the problem solving area of the instant invention. Since 1) Cole et al. teach the steps required to produce the information displayed in the three-dimensional plot which is equivalent to the claimed two-dimensional matrix, 2) Shao et al. teach that it is known to display information in the three-dimensional plot for the purpose of facilitating data analysis, and 3) Applicant admits that the two-dimensional matrix may be replaced with a suitable equivalent, it would have been obvious to one of ordinary skill in the art at the time of invention to construct a three-dimensional plot as claimed using the information produced by the prior art system disclosed by Cole et al. for the purpose of facilitating data analysis. The “outputting” and “processing” steps disclosed by Cole et al. and set forth in this Office Action may be embodied by the claimed “constructing” step based on the data analysis knowledge and using software readily available to the skilled artisan, or may qualify as suitable equivalents for producing the two-dimensional matrix.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

Art Unit: 3663

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexandra Awai whose telephone number is (571) 272-3079.

The examiner can normally be reached on 9:30-6:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Application/Control Number: 09/873,312

Page 9

Art Unit: 3663

March 13, 2007


JACK KEITH
SUPERVISORY PATENT EXAMINER